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EXAMINER	
ZERVIGON, RUDY	
ART UNIT	PAPER NUMBER
1763	

DATE MAILED: 04/05/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/828,067	CURRY ET AL.	
	Examiner	Art Unit	
	Rudy Zervigon	1763	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *05 January 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *29-35 and 38-50* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *29-35 and 38-50* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

2. Claims 29, 30, 31, 33, 34, and 42-50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Itsudo et al (JP05-198512) in view of Sivaramakrishnam; Visweswaren et al. (US 5,531,183 A). Itsudo teaches:

i. A wafer (2; Figure 6) processing apparatus (Figure 6, 8; abstract), comprising: a processing chamber (1; Figure 6; abstract) defined by a lower wall, an upper wall (8; Figure 6) and side walls extending from the lower wall to the upper wall (8; Figure 6), a wafer (2; Figure 6) supply opening (not shown; inherent) being formed in one of the walls for transferring a wafer (2; Figure 6) into the processing chamber (1; Figure 6; abstract); a susceptor (6; Figure 1) in the processing chamber (1; Figure 6; abstract) on which the wafer (2; Figure 6) can be located so that an upper surface of the wafer (2; Figure 6) faces the upper wall (8; Figure 6); a manifold (9; Figure 6) component located on the processing chamber (1; Figure 6; abstract) and, together with the upper surface of the upper wall (8; Figure 6), defining a manifold cavity (9; Figure 6); an exhaust line (4; Figure 6) connected to the processing chamber (1; Figure 6; abstract), for flowing a gas from the processing chamber (1; Figure 6; abstract), connected such that the gas has a tendency to flow toward the exhaust line (4; Figure 6); and a processing gas supply line (12; Figure 6) connected to the manifold (9; Figure 6) component for providing a processing gas wherein the processing gas comprises non-depleted reactive gases used

for processing the wafer – Applicant's claim requirement of gas identity, is an intended use claim requirement of thepending apparatus claims. Further, it has been held that claim language that simply specifies an intended use or field of use for the invention generally will not limit the scope of a claim (Walter , 618 F.2d at 769, 205 USPQ at 409; MPEP 2106). Additionally, in apparatus claims, intended use must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim (In re Casey,152 USPQ 235 (CCPA 1967); In re Otto , 136 USPQ 458, 459 (CCPA 1963); MPEP2111.02).

ii. wherein the upper wall (8; Figure 6) has a plurality of processing gas supply openings (10; Figure 6, 8), each of the processing gas supply openings (10; Figure 6, 8) formed into an upper surface and out of a lower surface of the upper wall (8; Figure 6) such that each processing gas supply opening is defined by a corresponding interior surface of the upper wall (8; Figure 6), the processing gas supply openings (10; Figure 6, 8) being nonuniformly (Figure 8) distributed over the upper wall (8; Figure 6) to create a flow pattern comprising a predominantly vertical flow of processing gas onto the wafer and mixing the resulting exhaust gases with non-uniformity distributed amounts of processing gas depending upon the position of the point of mixing relative to the exhaust line, and thus promotes even processing over the upper surface of the wafer (2; Figure 6), as claimed by claim 29 – When the structure recited in the reference is substantially identical to that of the claims, claimed properties or functions are presumed to be inherent (In re Best, 562 F.2d 1252, 1255, 195 USPQ 430, 433 (CCPA 1977); MPEP 2112.01).

iii. The apparatus (Figure 6, 8; abstract) of claim 29 wherein the openings (10; Figure 6, 8) are more densely located on one side of the upper wall (8; Figure 6) than on another side thereof, as claimed by claim 30

iv. The apparatus (Figure 6, 8; abstract) of claim 30 wherein the openings (10; Figure 6, 8) are substantially equal in size, as claimed by claim 31

v. The apparatus (Figure 6, 8; abstract) of claim 29 wherein the exhaust line (4; Figure 6) is connected at an exhaust location which is off-center with respect to a center point (geometric center of 8; Figure 8) of the wafer (2; Figure 6), when viewed from above, so that the gas exits out of the processing chamber (1; Figure 6; abstract) at the exhaust location which is off-center with respect to a center point (geometric center of 8; Figure 8) of the wafer (2; Figure 6), as claimed by claim 33

vi. The apparatus (Figure 6, 8; abstract) of claim 33 wherein a channel (present, not labelled; Figure 1) is defined within the processing chamber (1; Figure 6; abstract), the channel (present, not labelled; Figure 1) being concentric with the wafer (2; Figure 6), gas flowing radially outwardly over the wafer (2; Figure 6) into the channel (present, not labelled; Figure 1), from the channel (present, not labelled; Figure 1), to the exhaust location into the exhaust line (4; Figure 6), as claimed by claim 34 – When the structure recited in the reference is substantially identical to that of the claims, claimed properties or functions are presumed to be inherent (In re Best, 562 F.2d 1252, 1255, 195 USPQ 430, 433 (CCPA 1977); MPEP 2112.01).

vii. A wafer (2; Figure 6) (2; Figure 6) processing apparatus (Figure 6, 8; abstract), comprising: a processing chamber (1; Figure 6; abstract) defined by a lower wall, an

upper wall (8; Figure 6) and side walls extending from the lower wall to the upper wall (8; Figure 6); a susceptor (6; Figure 1) in the processing chamber (1; Figure 6; abstract) on which the wafer (2; Figure 6) can be located so that an upper surface of the wafer (2; Figure 6) faces the upper wall (8; Figure 6); a manifold (9; Figure 6) component located on the processing chamber (1; Figure 6; abstract) and, together with the upper surface of the upper wall (8; Figure 6), defining a manifold cavity (9; Figure 6); an exhaust system comprising an exhaust line (4; Figure 6) connected to the processing chamber (1; Figure 6; abstract), for flowing an exhaust gas from the processing chamber (1; Figure 6; abstract); a processing gas supply line (12; Figure 6) connected to the manifold (9; Figure 6) component; a plurality of processing gas supply openings (10; Figure 6, 8) distributed non-uniformly in the upper wall (8; Figure 6) providing a means for supplying a processing gas from the manifold cavity (9; Figure 6) to the processing chamber (1; Figure 6; abstract), wherein the processing gas comprises non-depleted reactive gases used for processing the wafer (2; Figure 6), wherein the exhaust gas comprises reacted gases and depleted processing gas, wherein the processing gas supply openings (10; Figure 6, 8) may be non-uniformly distributed over the upper wall (8; Figure 6), wherein the processing gas supply openings (10; Figure 6, 8), the manifold cavity (9; Figure 6) and component, processing gas supply, and exhaust system predominantly determine the flow pattern of processing gas onto the upper surface of the wafer (2; Figure 6), wherein the flow pattern of processing gas may be capable of consistent uniform processing of the wafer (2; Figure 6)s over the entire surface of the wafer (2; Figure 6), as claimed by claim

viii. The apparatus of claim 42, wherein the exhaust line (4; Figure 6) is connected at an exhaust location which is off-center with respect to a center point of the wafer (2; Figure 6), when viewed from above, so that the processing gas exits out of the processing chamber (1; Figure 6; abstract) at the exhaust location which is off-center with respect to a center point of the wafer (2; Figure 6), as claimed by claim 43

ix. The apparatus of claim 42, wherein the processing gas openings comprises openings on the manifold cavity (9; Figure 6) side of the upper wall (8; Figure 6) that differ in location and/or direction than the corresponding openings on the processing chamber (1; Figure 6; abstract) side of the upper wall (8; Figure 6), as claimed by claim 44

x. The apparatus of claim 42, wherein the processing gas supply openings (10; Figure 6, 8) create a predominately vertical flow pattern of processing gas onto the upper surface of the wafer (2; Figure 6), as claimed by claim 45

xi. The apparatus of claim 42, wherein the processing gas provided into the processing chamber (1; Figure 6; abstract) enters predominantly through the processing gas supply openings (10; Figure 6, 8) , as claimed by claim 46

xii. A wafer (2; Figure 6) (2; Figure 6) processing apparatus (Figure 6, 8; abstract), comprising: a processing chamber (1; Figure 6; abstract) defined by a lower wall, an upper wall (8; Figure 6) and side walls extending from the lower wall to the upper wall (8; Figure 6); a susceptor (6; Figure 1) in the processing chamber (1; Figure 6; abstract) on which the wafer (2; Figure 6) can be located so that an upper surface of the wafer (2; Figure 6) faces the upper wall (8; Figure 6); a manifold (9; Figure 6) component located on the processing chamber (1; Figure 6; abstract) and, together with the upper surface of

the upper wall (8; Figure 6), defining a manifold cavity (9; Figure 6); a processing gas supply line (12; Figure 6) connected to the manifold (9; Figure 6) component; a plurality of processing gas supply openings (10; Figure 6, 8) in the upper wall (8; Figure 6), wherein a processing gas from the manifold cavity (9; Figure 6) may pass into the processing chamber (1; Figure 6; abstract), wherein the processing gas comprises non-depleted reactive gases used for processing the wafer (2; Figure 6), wherein the processing gas supply openings (10; Figure 6, 8) may be non-uniformly distributed over the upper wall (8; Figure 6), wherein the processing gas supply openings (10; Figure 6, 8) create a predominately vertical flow pattern of processing gas onto the upper surface of the wafer (2; Figure 6), wherein the flow pattern of processing gas may be capable of consistent uniform processing of wafer (2; Figure 6)s over the entire surface of the wafer (2; Figure 6)', and an exhaust system comprising an exhaust line (4; Figure 6) connected to the processing chamber (1; Figure 6; abstract), for flowing an exhaust gas from the processing chamber (1; Figure 6; abstract), wherein the exhaust gas comprises reacted gases and depleted processing gas, as claimed by claim 47

xiii. The apparatus of claim 47, wherein the processing gas provided into the processing chamber (1; Figure 6; abstract) enters predominantly through the processing gas supply openings (10; Figure 6, 8) , as claimed by claim 48

xiv. The apparatus of claim 47, further comprising a chamber within the processing chamber (1; Figure 6; abstract), wherein the channel may be concentric and below the wafer (2; Figure 6), wherein the processing gas may flow radially outwardly over the wafer (2;

Figure 6) and into the channel, and then from the chamber to the exhaust location and into the exhaust line (4; Figure 6) , as claimed by claim 49

xv. The apparatus of claim 49, wherein the inner diameter of the channel may be comparable to or slightly less than the outer diameter of the wafer (2; Figure 6) , as claimed by claim 50

Itsudo does not teach a gas supply connected via a processing gas supply line opening formed through an upper surface of the manifold cavity.

Sivaramakrishnam teaches a gas supply (40,60,80; Figure 2) connected via a processing gas supply line opening formed through an upper surface (top of 10) of a manifold cavity (38).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to add Sivaramakrishnam's gas supplies and for Itsudo to optimize the relative location of his processing gas supply line opening.

Motivation to add Sivaramakrishnam's gas supplies and for Itsudo to optimize the relative location of his processing gas supply line opening is to use process gas sources as precursors for operations and to optimize desired process gas flows as taught by Itsudo (abstract). It is well established that the rearrangement of parts is considered obvious to those of ordinary skill (In re Japikse , 181 F.2d 1019, 86 USPQ 70 (CCPA 1950); In re Kuhle , 526 F.2d 553, 188 USPQ 7 (CCPA 1975); Ex parte Chicago Rawhide Manufacturing Co. , 223 USPQ 351, 353 (Bd. Pat. App. & Inter. 1984).; MPEP 2144.04)

3. Claims 32, 35, 38, 39, and 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Itsudo et al (JP05-198512) and Sivaramakrishnam; Visweswaren et al. (US 5,531,183 A) in view of Nguyen, Tue (US 6,444,039 B1). Itsudo and Sivaramakrishnam are discussed above.

Itsudo further teaches Itsudo's apparatus (Figure 6, 8; abstract) of claim 29 wherein Itsudo's exhaust line (4; Figure 6) is connected at an exhaust location which is off-center with respect to a center point of Itsudo's wafer (2; Figure 6), when viewed from above, so that Itsudo's gas exits out of Itsudo's wafer (2; Figure 6) at Itsudo's exhaust location which is off-center with respect to a center point of Itsudo's wafer (2; Figure 6), as claimed by claim 40. Itsudo further teaches Itsudo's apparatus (Figure 6, 8; abstract) of claim 40 wherein Itsudo's openings (10; Figure 6, 8) are formed to increase a flow rate of Itsudo's gas over Itsudo's wafer (2; Figure 6) farther from Itsudo's exhaust location, as claimed by claim 41 – When the structure recited in the reference is substantially identical to that of the claims, claimed properties or functions are presumed to be inherent (In re Best, 562 F.2d 1252, 1255, 195 USPQ 430, 433 (CCPA 1977); MPEP 2112.01).

Itsudo and Sivaramakrishnam do not teach:

i. Itsudo's apparatus (Figure 6, 8; abstract) of claim 29 wherein flow of gas in Itsudo's processing chamber (1; Figure 6; abstract) is laminar, as claimed by claim 32

ii. Itsudo's apparatus (Figure 6, 8; abstract) of claim 34 wherein Itsudo's openings (10; Figure 6, 8) are more densely located farther from Itsudo's exhaust location, as claimed by claim 35

iii. Itsudo's apparatus (Figure 6, 8; abstract) of claim 29 wherein there are first and second ones of Itsudo's openings (10; Figure 6, 8) on opposing sides of a point (geometric center of 8; Figure 8) on Itsudo's upper wall (8; Figure 6), Itsudo's first opening having a lower end which is angularly displaced relative to an upper end thereof in a selected direction about Itsudo's point (geometric center of 8; Figure 8), and Itsudo's second opening having a lower end which is angularly displaced relative to an upper end thereof in

Itsudo's selected direction, so that Itsudo's openings (10; Figure 6, 8) jointly create a circular gas flow pattern in Itsudo's processing chamber (1; Figure 6; abstract), as claimed by claim 38 – Applicant's Figure 4, 5 embodiment

iv. Itsudo's apparatus (Figure 6, 8; abstract) of claim 38 wherein a third of Itsudo's openings (10; Figure 6, 8), on a side of Itsudo's second opening opposing Itsudo's first opening, has a lower end which is displaced in Itsudo's first direction relative to an upper end thereof, as claimed by claim 39

Nguyen teaches a portion (vertical part) of a gas distribution plate (111; Figure 10) including injection holes (117, Figure 10) with Applicant's claimed angular displacement as per Applicant's Figures 4, 5.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to angle Itsudo's processing gas supply openings (10; Figure 6, 8) as taught by Nguyen, further to process the wafer under laminar flow including optimized hole distrubutions as taught by Itsudo.

Motivation to angle Itsudo's processing gas supply openings (10; Figure 6, 8) as taught by Nguyen, further to process the wafer under laminar flow including optimized hole distrubutions as taught by Itsudo is for influencing flow patterns of Itsudo's process gases to achieve controlled CVD film thickness distributions as taught by Itsudo (abstract).

Response to Arguments

4. Applicant's arguments with respect to claims 29-35, and 38-50 have been considered but are moot in view of the new grounds of rejection.

Conclusion

5. Applicant's amendment necessitated the new grounds of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Rudy Zervigon whose telephone number is (571) 272-1442. The examiner can normally be reached on a Monday through Thursday schedule from 8am through 7pm. The official fax phone number for the 1763 art unit is (571) 273-8300. Any Inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Chemical and Materials Engineering art unit receptionist at (571) 272-1700. If the examiner can not be reached please contact the examiner's supervisor, Parviz Hassanzadeh, at (571) 272-1435.

3/4/6